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AUTHOR	Tsikalas, Kallen; Gross, Elisheva F.
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ABSTRACT

Most research on the effects of computing on students' educational performance and progress has examined direct relationships between computer-based activities and schoolwork and/or attitudes about school and education. This study, based on a sample of participants in a comprehensive, school-centered computer distribution program in New York City, explored the hypothesis that low-income, ethnically diverse adolescents use home computing resources to meet their basic psychological needs and that it is through the fulfillment of these needs that they experience the greatest positive effects (including school-related outcomes) of computers. It was expected that positive impacts would be observed with greater frequency among students who used computers most at home. Student surveys, journals, and focus group interviews were used to investigate daily computing activity; subjective experiences of sharing, receiving, learning, and pride around computing; self-reported impact of home computing; and school-related attitudes and expectations. Results support the hypotheses, suggesting that when students engage in home computing practices that maximize psychological need fulfillment, they are more likely to report positive attitudes about school, themselves, and the impact of home computing thereon. (SM)

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Running head: Low-income, urban adolescents' home computer use

Home computer use among low-income, minority urban adolescents: Fulfillment of basic needs and impact on personal and academic development.

Kallen Tsikalas

Computers for Youth

Elisheva F. Gross

UCLA

Address Correspondence to Kallen Tsikalas, Director of Research & Learning Services, Computers for Youth, 505 8th Avenue, Suite 2402, New York, NY 10018

Electronic mail can be sent to ktsikalas@cfy.org and egross@ucla.edu.

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Abstract

Most research on the effects of computing on students' educational performance and progress has examined direct relationships between computer-based activities and schoolwork and/or attitudes about school and education. The present study, based on a sample of participants in a comprehensive school-centered computer distribution program in New York City, explored the hypothesis that low-income, ethnically diverse adolescents use home computing resources to meet their basic psychological needs and that it is through the fulfillment of these needs that they experience the greatest positive effects (including school-related outcomes) of computers. In addition, it was expected that positive impacts would be observed with greater frequency among students who used computers most at home. Results supported the hypotheses, suggesting that when students engage in home computing practices that maximize psychological need fulfillment, they are more likely to report positive attitudes about school, themselves, and the impact of home computing thereupon.

Introduction

Beyond physiological requirements for survival, humans have three basic psychological needs: autonomy, relatedness, and competence (Deci and Ryan, 1991; Connell & Wellborn, 1991) To be autonomous, individuals must feel that they possess a sufficient level of control over their own choices and activities and that they are recognized as themselves apart from any social or familial grouping. To feel a sense of belonging, individuals must perceive they have strong and stable interpersonal relationships and that they are validated in these relationships. To be competent, individuals must feel effective in bringing about the results and outcomes that they desire from particular activities. Fulfillment of these three basic needs is associated with daily subjective well-being (Reis, Sheldon, Gable, Roscoe, and Ryan, 2000) intrinsic motivation (Deci and Ryan, 2000), and school engagement (Connell & Wellborn, 1991; Connell, Spencer, & Aber, 1994).

In the present research, we propose that young people use home computers in ways that fulfill these basic psychological needs. Working inductively from qualitative and quantitative data, we map participants' subjective experiences of computing to their psychological needs (see Figure 1). We suggest that adolescents' experiences of sharing and receiving information around computing fulfill needs for belonging and competence. Experiences of learning are most related to feelings of autonomy and competence, and experiences of pride may simultaneously fulfill psychological needs for autonomy, belonging, and competence.

Thus, although students may engage in specific computing activities that address a single need, they may also use the computer in ways that simultaneously fulfill multiple

needs. For example, playing computer games may address adolescents' need for autonomy (they are doing what they want). If students feel that they have learned from their game play (e.g., as evidenced by attaining higher levels of mastery), this activity may also increase their competence. In addition, by sharing their knowledge of game strategies and circumstances with others in their home or on the Internet, adolescents may also enhance their relatedness.

Given recent evidence that youth display greater intrinsic motivation (Deci and Ryan, 2000) and school engagement (Connell & Wellborn, 1991; Connell, Spencer, & Aber, 1994) when their needs for autonomy, competence, and relatedness are met, we expect that positive school- and self-related outcomes will be associated with subjective experiences of computing that address these needs. We propose that there exists a multiplicative effect around adolescents' appropriation of home computing resources such that youth experience the greatest effects when they engage in computing activities that simultaneously fulfill multiple psychological needs.

We further assert that the home is a particularly important context for adolescents to meet these needs through computing. It provides a unique setting for adolescents to appropriate computers for their own needs and personal development for three reasons. First, the home is less restrictive than other computing environments: Adolescents report that they are able to spend more time on the computer at home than in other places, even when their families establish structures and schedules around home computer use. Similarly, young people articulate that it is acceptable for them to use their home computers to pursue a wider ranger of activities—gaming, chatting, exploring one's own interests as well as doing homework—perhaps because the home is a place for living,

learning *and* leisure.

Second, the home is the nexus of family interactions: In the home, young people may use computers to strengthen and reinforce existing family relationships. For example, they may collect information from the Internet that benefits members of their families and share this information or they may play games with a sibling or parent. At home, adolescents may also engage in computing practices that supplement family provisions without alienating the people who are so important to them. For example, adolescents may exercise extensive on-line peer networks at home when their families may not have the time or the interpersonal skills to relate to them effectively. By staying at home to do this, however, they still remain at least physically present with their families and are able to experience the types of support that their families *can* provide.

Third, the home offers greater privacy than most other locations. In the home, young people may explore interests that they perceive are not socially acceptable among their peers.

Methods

Participants

89 students participated in the present research. The sample consisted of 43 males and 46 females, ranging in age from 12 to 15 years of age, with the majority aged 13 (M = *13*, SD = *0.772*). Of the 87 participants who reported their ethnicity, 39.1% identified themselves as African-American , 36.8 % as Hispanic/Latino, 13.8% as being of mixed heritage (African-American and Hispanic/Latino), 8.0% as Caribbean, and 2.3% as Asian.

Participants were enrolled as seventh or eighth graders at one of two public

middle schools in New York City—the Arts and Education Academy (AEA) in East Harlem and the Brooklyn Comprehensive School (BCS) in East New York, Brooklyn.[1] Based on data from the New York City Board of Education, over 90% of students at each of these schools met the criteria to receive free lunch services.

Context: a Comprehensive School-centered Computer Distribution Program

Participants in this study were enrolled in a program sponsored by Computers for Youth. Computers for Youth (CFY) is a New York City based non-profit organization that places computers in the homes of underserved children and families and provides an array of services to help them use the technology to enhance learning in the home and to improve quality of life. CFY's approach to bridging the Digital Divide is unique in that it is both comprehensive and community-centric.

Comprehensive approach. CFY recognizes that it is not adequate to simply drop technology into the homes of low-income, novice technology users. The organization instead provides a suite of services and opportunities to help underserved children and families become skilled technology users. With its school and community partners, CFY provides basic computer training; technical support; tailored web content; teacher support services; and opportunities for young people to become creators, not just consumers, of information technology.

Community-centric approach. Rather than providing children and families with computers on an individual basis, CFY saturates entire communities. CFY selects middle schools in New York City with high poverty statistics and strong district support. The organization then provides home computers to every family with a child in the school and every teacher in the school. In this way, students and their families have a cohort of

[1] The names of the schools discussed in this paper are pseudonyms.

peers with whom to share experiences and learn. Additionally, teachers can assume that all of their students have access to home computers and adjust their practices accordingly.

During the 2000-2001 school-year, CFY provided home computers and support services to approximately 400 underserved students and families in three low-income, New York City neighborhoods. Participants in this study were recipients of CFY's 2000-2001 services and were demographically representative of the entire population of students served by CFY's program. Approximately half of students attending AEA and BCC did *not* have access to home computers prior to receiving a computer from CFY. Among students who did have prior home computers, about 25% also had home Internet access; the others did not.

Data Collection Procedures

To assess how the young people in this study made use of their home computers and to measure school-related outcomes, we employed a multi-method approach to data collection. We gathered a combination of quantitative and qualitative data from three sources:

1) Paper-and-pencil surveys administered to students at school 3-7 months after CFY computer distribution;
2) Three end-of-day reports (journals) completed by students at home on three consecutive weeknights during the spring semester, about 3 months post-distribution (adapted from Gross, Juvonen & Gable, 2002); and
3) Focus group interviews with students near the conclusion of the school-year, 3-7 months after participants had received computers.

All of the adolescents included in this study completed both surveys and journals.

A sub-sample of these students also participated in focus group interviews.

Measures

Daily computing activity. Participants' daily activities were assessed using items adapted from Gross et al. (2002). In their daily journals, participants were asked how much time they spent on their home computers. Participants marked one of five alternatives (*none*, *30 minutes or less*, *1 hour*, *2-3 hours*, *4 hours or more*) to indicate daily engagement. Participants were further asked to indicate whether they engaged in each of eight computing activities (e.g., word processing, chatting, designing graphics) that day.

Subjective experiences of sharing, receiving, learning and pride around computing. Participants were asked to indicate whether they received information, shared information, experienced pride, and/or learned something related to their computing that day. For each type of experience, they were asked to describe the activity (e.g., "With whom did you share information? What did you show them?").

Self-reported impact of home computing. Adolescents in the study responded to nine post-survey questions about the long-term impacts of having a home computer. Participants were asked to indicate whether or not each statement (e.g., "Having a home computer has helped me feel more confident in what I can do") was true for them. Additionally, on a scale of 1 (*strongly disagree*) to 4 (*strongly agree*), they rated their agreement with the statement, "I invest more in my education as a result of having a home computer."

School-related attitudes and expectations. Participants responded to nine post-survey items about their school-related attitudes towards school and self and expectations

for academic attainment. A single multiple-choice item ("How far do you expect to go in school?") measured students' academic expectations, with seven possible responses (from *some high school* to *graduate school*). On a scale of 1 (*strongly disagree*) to 4 (*strongly agree*), participants responded to eight questions about school-related attitudes. These items included the following: "Most of the time school is boring to me," "I am a good student," and "I can express myself creatively in my homework."

Data Analysis Procedures

We analyzed quantitative data using traditional statistical techniques (e.g., t-tests, ANOVAs, and chi-square tests). Qualitative data was summarized and analyzed thematically.

Results

Daily Home Computer Usage

Time on home computer. On average, adolescents in the study spent approximately 1.5 hours per night on their home computers (M = 100.12 min, SD = 72.30). Eighth grade students reported spending more time on the computer than seventh graders, t (87) = -2.42, $p < .05$. Average daily computer usage also varied marginally by school and by whether computer-related homework had been assigned. Students at AEA spent slightly more time on their home computers than students at BCS (Ms= 111.61 min, 80.61 min, t (87) = 1.99, $p < .06$). Students who reported that they had been assigned homework that required them to use their home computers used their computers for more time than did peers who had not received such assignments, (Ms= 117.58 min, 88.73 min, t (86) = 1.83, $p < .10$). Time on home computer was *not* significantly associated with students' gender, age, ethnicity, or prior home computer access.

Location of heaviest computer usage. The majority of participants (75.8%; n = 50) indicated that they used computers most at home. The remaining 16 students in the sample reported that they used computers most at other locations, such as school, community technology centers, libraries, and friends' or relatives' homes. Students at AEA were more likely than those at BCS to use computers most at home, χ^2 (1, 66) = 4.13, $p < .05$. There were no differences by age, grade, gender or ethnicity in the location of greatest computer use.

Daily computing activities. As shown in Figure 1, students engaged in a variety of computing activities at home—word processing, playing games, designing and editing graphics, using the web, and communicating on-line via e-mail, chat, and instant messaging (IM). For the most part, daily computing activities did not differ by gender, age, grade, ethnicity, or prior home computer access. The two exceptions to this pattern were that girls were more likely than boys to IM, χ^2 (1,81) = 5.08, $p < .05$, and eighth graders were more likely than seventh graders to use their home computers for word processing, χ^2 (1,80) = 3.90 $p < .05$. Several school-level differences in specific computing activities were observed. Students who attended at AEA were significantly more likely to use their home computers for four specific activities: to design/edit graphics, χ^2 (1,81) = 6.80 $p < .01$;to browse the web, χ^2 (1,81) = 4.29 $p < .05$; to communicate via e-mail, χ^2 (1,81) = 5.01 $p < .05$; and to IM, χ^2 (1,81) = 3.74 $p = .05$. Additionally, students who engaged in Internet-based activities (e.g., using the web and communicating online) spent, on average, more time on their home computers than did students who did not report using the Internet ($ps < .001$ for all Internet-based activities).

Daily Subjective Computing Experiences

Sharing information. Over the three-day period of the journal study, 58.6% (n = 51) of participants reported that they showed or explained something on their computer to people at home. Whether students shared information with others was not significantly associated with their demographic characteristics or school. However, sharing was marginally related to whether or not they had been assigned homework requiring computer use. Participants who reported that they had been assigned homework that required them to use their home computers during the three day period were marginally more likely to indicate that they showed or explained something on the computer to someone in their home, χ^2 (1,86) = 2.94, $p < .10$.

Sharing occurred around many types of computing activities: Students explained to friends and family members how to use and customize basic hardware and software tools. They discussed activities they enjoyed, displayed projects and products that they had created, and explained uses of computing that demonstrated a deeper understanding of the value of these tools. Table 1 presents specific examples of computer-related sharing from the students' journals.[2]

Receiving information. One-third of participants (33.7%, n = 29) indicated that someone from home showed or explained to them on their home computers. Females were marginally more likely than males to report this activity, χ^2 (1, 86) = 3.05, $p < .10$. No other demographic or school variables were significantly associated with this activity.

For the most part, adolescents received information on how to accomplish specific tasks on their computers. They reported being shown "how to use a radio on the

[2] Throughout this paper, students' comments are inserted verbatim, with misspellings and code language preserved.

computer," "how to make a spreadsheet," "how to draw something and save it as a background," and "how to make slide shows." Students also received information on more nuanced aspects advanced of computing. One student said that she was taught "that you can't give out your number or address to people you don't know you met on the chat room." Another student indicated that "My father showed me the logic to a computer game called Minesweaper."

Learning. Nearly half of participants (44.2%; $n = 38$) indicated that their computer helped them learn something at least once during the three-day journal period. Latino students were significantly more likely than African-American students to report that they learned something, χ^2 (1,49) = 5.89, $p < .05$. Similarly, students who were assigned homework that required them to use their home computers were more likely to report that they learned something on their home computers, χ^2 (1,85) = 5.52, $p < .05$.

In their qualitative responses, these students often described learning activities that were related to their schoolwork. For example, they noted that they learned: "New poetry of William Shakespeare," "About the lifestyles of people in Bolivia," "How breast cancer develop," and "information about the human body and other stuff." They also described improving their textual and numerical literacy: "The computer help me correct my spelling and improve my writing," "Learn Spanish," and "It helped how to divide and multiply couse I wasn't that good at it." Finally, students indicated that they learned computer-related skills through their home computers: "How to type," "How to trouble shoot," "How to organize my e-mail," "I learn about networking," and "I learned how to search for things I need."

Pride. Somewhat more commonly experienced than learning was pride, reported

at least once during the three-day period by 51.2% of participating youth. Students who were assigned homework requiring them to use their home computers were moderately more likely to say that they did something on their home computer that made them proud, χ^2 (1, 85) = 2.92 , $p < .10$. Pride was not significantly related to any demographic variables.

Participants noted that creating things on the computer, improving their skills and performance, improving social relationships, doing homework, and doing things with others made them feel proud of themselves. Table 2 lists several students' descriptions of computing activities that made them proud.

Self-Reported Impacts of Home Computing

Adolescents in the study responded to nine questions about the long-term impacts of having a home computer. Two-thirds (n = 46) of students reported that having a home computer made a difference in their lives; 14-year-old students were significantly more likely than their younger peers to report this impact, χ^2 (2, 67) = 10.96, $p < .01$. The percentage of participants endorsing each of six specific personal and interpersonal impacts is shown in Figure 2.

School-Related Attitudes and Expectations

Expectations for academic attainment. On the post-survey, nearly 40% (n = 26) indicated that they expected to attend a four year college; another 33% (n = 22) reported that they expected to attend a professional school beyond college (e.g., law school, medical school). Students at BCS had marginally higher academic expectations for themselves than students at AEA , (Ms = 6.272, 5.818, t (64) = 1.85, $p < .10$).

School-related attitudes. Over half (53.6%) of the adolescents in this study agreed

or strongly agreed that most of the time school was boring to them. Despite this, 91% of participants indicated that they were good students, and 86.8% felt proud of the work they did for school. 80.6% of the students agreed or strongly agreed that their families were interested in their homework, and 75.7% felt the same about being able to express themselves creatively in their homework.

The Importance of the Home as a Computing Context

Our data indicate that it *does* make a difference *where* adolescents engage in computing activities. Using computers at home versus all other locations is significantly associated with a number of activities, practices and outcomes.

Time on home computer and computer-based activities. Adolescents who used computers most at home also spent more time on their computers than their peers who used computers most at other locations, (Ms = 109.50 min, 70.00 min, t (64) = 2.011, $p <$ .05). Additionally, participants who used computers most at home versus anywhere else spent more time visiting websites, e-mailing, chatting, instant messaging, and communicating online with school peers, all ps $\leq .05$.

Subjective experiences around computing. Participants who used computers most at home experienced more pride around their computing activities. Fisher's two-tailed tests revealed that students who used computers most at home (n = 49) versus anywhere else (n = 16) were significantly more likely to say that they did something on their home computer that made them proud, $p < .02$. These students were also marginally more likely to report that they shared something with another person using their home computer, χ^2 (1, 65) = 2.84, $p < .10$.

Self-reported impacts. Participants who used computers most at home were

significantly more likely than their peers to say that having a home computer made a difference in their lives, χ^2 (1, 65) = 9.38, $p < .01$. Similarly, adolescents who used computers most at home ($n = 50$) versus anywhere else ($n = 16$) were more likely to say that having a home computer helped them relax, $p < .01$ and helped them make new friends, $p < .10$. Both findings were verified by Fisher's two-tailed tests.

School-related outcomes. Fisher's two-tailed test indicated that students who used computers most at home ($n = 50$) versus anywhere else ($n = 16$) were significantly more likely to say that having a home computer helped them do better in school, $p < .001$. These students also reported greater feelings of pride in their schoolwork, (Ms = 3.25, 2.81, t (63) = 2.00, $p < .06$) and higher academic expectations for themselves, (Ms = 6.13, 5.56, t (60)= -2.12, $p < .05$).

Associations Between School-Related Outcomes and Impacts and Computing Activities

A series of two-tailed Chi-square tests and t-tests were performed to examine associations of 1) specific computing activities and 2) subjective experiences around computing to the outcomes of interest: school-related attitudes and self-reported impact of home computing.

Associations with specific computing activities. Word processing, e-mail, instant messaging, and visiting websites were significantly associated with several school-related outcomes. Students who used word processing on a daily basis felt more pride in their work for school, (Ms = 3.38, 2.97, t (60) = -2.30, $p < .05$) and were better able to feel they could be creative in their homework (Ms = 3.12, 2.71, t (58) = -1.92, $p < .10$). Students who used e-mail on a daily basis were more likely to indicate that having a home helped them do better in school, χ^2 (1, 64) = 10.51, $p < .01$. Students who used

instant messaging on a daily basis reported that they were better students (*M*s=3.46, 3.09, t (60) = -2.14, $p < .05$) and that they felt marginally more pride in the work they did for school, (*M*s = 3.36, 3.00, t (60) = -2.30, $p < .10$). Students who visited websites on a daily basis were marginally more likely to say that having a home computer increased their curiosity, χ^2 (1, 64) = 2.83, $p < .10$. It is notable that being assigned homework that required computer use was associated with *neither* school-related outcomes nor impacts.

Associations with computing-related sharing. Participants who shared something with another person using their home computers were more likely to report that having a computer had made a difference in their lives (χ^2 (1, 68) = 4.11, $p < .05$). These youth were also more likely to report that they were better students (*M*s = 3.03, 2.96, t (64) = 2.31, $p < .05$) and that they put more effort into their education with their computer (*M*s = 2.95, 2.44, t (65) = 2.22, $p < .05$). Adolescents who shared information around computers with people in their homes noted that school was less boring than their peers who did not share (*M*s = 2.44, 2.85, t (66) = 2.05, $p < .05$).

Associations with computing-related pride. Participants who did something on computer that made them proud were more likely to report that they put more effort into their education with the computer (*M*s = 2.97, 2.45, t (64) = 2.300, $p < .05$) and reported higher educational expectations for themselves, (*M*s = 6.17, 5.66, t (62) = 2.213, $p < .05$). They were also more likely to indicate that having home computer increased their curiosity (χ^2 (1, 68) = 5.26, $p < .05$) and were marginally more likely to feel that it improved their relationships with their families (χ^2 (1, 68) = 2.87, $p < .10$). In addition, adolescents who felt (vs. did not feel) computing-related pride on a daily basis were marginally less likely to feel that school was boring (*M*s = 2.46, 2.83, t (65) = 1.908, p

<.10) and were more likely to feel that having a home computer had made a difference in their lives, χ^2 (1, 67) = 3.34, $p < .10$.

Associations with receiving computing-related information. Participants who reported that someone explained something to them on their home computer were significantly more likely to report that having a home computer made a difference in their lives, χ^2 (1, 67) = 7.85, $p < .01$. These participants were also more likely to report that having a home computer helped them feel curious about more things χ^2 (1, 68) = 9.87, $p < .01$, helped them relax, χ^2 (1, 68) = 5.62, $p < .02$, and improved relations with family members, χ^2 (1, 68) = 4.24, $p < .05$.

Experiences of learning around home computing. Students who reported learning something on computer at least once across the thee-day journal period were marginally more likely to report that that having home computer made a difference in their lives, χ^2 (1, 67) = 3.34, $p < .10$, and helped them like school more, χ^2 (1, 68) = 3.22, $p < .10$. These adolescents were significantly more likely to indicate that home computing helped them relax, χ^2 (1, 68) = 3.99, $p < .05$, feel more confident, χ^2 (1, 68) = 7.62, $p < .01$, curious, χ^2 (1, 68) = 7.07, $p < .01$, and in control, χ^2 (1, 68) = 7.09, $p < .01$. In addition, they were more likely to report improved relations with family as a result of home computer ownership, χ^2 (1, 68) = 5.19, $p < .05$.

Discussion and conclusions

The correlational patterns described in the previous sections imply that the home is a unique and powerful context for computing. Participants who used their computers most at home spent more time on their computers, engaged in more Internet-based practices, and were more likely to report that they shared information with people in their

homes and participated in activities that made them proud of themselves. Adolescents who used computers most at home felt that having a computer at home helped them relax, make new friends, and do better in school. They reported higher academic expectations and more pride in their schoolwork than did peers who used the computer most outside the home.

Our data suggest that students who use computers at home (above other locations) satisfy their basic psychological needs and that in so doing, they experience positive school-related outcomes and impacts. Qualitative data link various computing activities with these basic needs. Particularly through their experiences of sharing information and feeling proud of the work they do on their home computers, students fulfill their needs for needs for autonomy, belonging and competence. For example, when a student reports that he is proud of himself for moving to the next level in a computer game, he is commenting on his increase in competence. Similarly, when an adolescent notes that she is happy with herself because she and her cousin created something together on the computer, she is describing how, though computing, she has increased her feelings of belonging and competence.

Furthermore, computing in the home is strongly associated with school-related outcomes and other impacts (such as increased curiosity, confidence, control, and relaxation) that may be considered precursors for future learning activities.

Some specific computing activities—visiting websites, word processing, e-mailing and IMing—appear to be associated with perceptions of positive impact and more positive attitudes towards education. However, independent of the specific computing application used, youth who share and receive information and those who

experience pride and learning around their home computers are likely to experience many more of the positive school-related effects of home computing. In the present sample, students who shared and received information and those who experienced pride and learning in the course of their home computer use more often reported that they are good students and that they put more effort into their educations as a result of having home computers, and less often reported that school is boring to them. They were more likely to indicate increases in curiosity and confidence and improved relationships with family members, and, on average, expressed greater pride in their schoolwork and higher academic expectations than did youth who did not report such daily computer-related experiences.

Interestingly, simply being assigned homework that requires the use of computers was not directly related to positive impacts, but *was* moderately associated with whether or not adolescents share information around home computing. This association suggests that the most vital function of computer-related homework assignments may ultimately be to promote interpersonal exchange in the home.

Two limitations to the present research should be noted. First, all data was self-reported by participants. Future research should include third party data on students' performance in and attitudes towards school, including teachers' reports, school grades, test scores, attendance and disciplinary records. Second, all associations reported here are correlational; as a result, we cannot make inferences regarding the direction of causality. In future research, we will more directly measure the constructs of autonomy, belonging, and competence. We will examine longitudinally associations among participants' computing experiences, attitudes, skills and achievement through the

administration of surveys both prior to and three to seven months following distribution of home computers. In addition, we plan to conduct a controlled study, comparing students who have and have not yet received CFY computers, to determine the extent to which our findings may be explained by home computing per se versus other factors.

In summary, the present research provides preliminary evidence for a more indirect pathway between home computing activities and academic performance and progress than has been previously suggested. We find that adolescents who leverage home computing activities to meet their needs for autonomy, belonging and competence are likely to experience more positive effects of computing. This pathway has heretofore remained unexamined in studies of computing and education and is deserving of more extensive research.

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Table 2.

Adolescents' Pride about Their Home Computing Activity

Activities about which participants report pride	Examples from students' journal responses
Creating something on the computer	Make business cards. Some online creatures that I made. I wrote a little essay on my future. A picture card for my grandfather's birthday. A Power Point slide show. I wrote poems and I drew. My new music beat that I created on a website.
Improving skills and performance	To type faster. How to draw better. I won first place twice as two different monster trucks. It made me feel good because I was always losing.
Improving social relations	New friendz and best friends from skool! Make a new friend. Send my friends information without the phone and hearing other business.
Doing homework	I'm now 94% finished with my LA/ Literacy homework. It helped me finish my women's history month project.
Doing things together with others	I showed my dad how to do something on the computer. I showed my family things that they never knew. It made me proud knowing that I taught something [to younger siblings]. Me and my cousin made several art graphics. I was proud because we did it together.

Table 1.

Adolescents' Sharing around the Home Computer

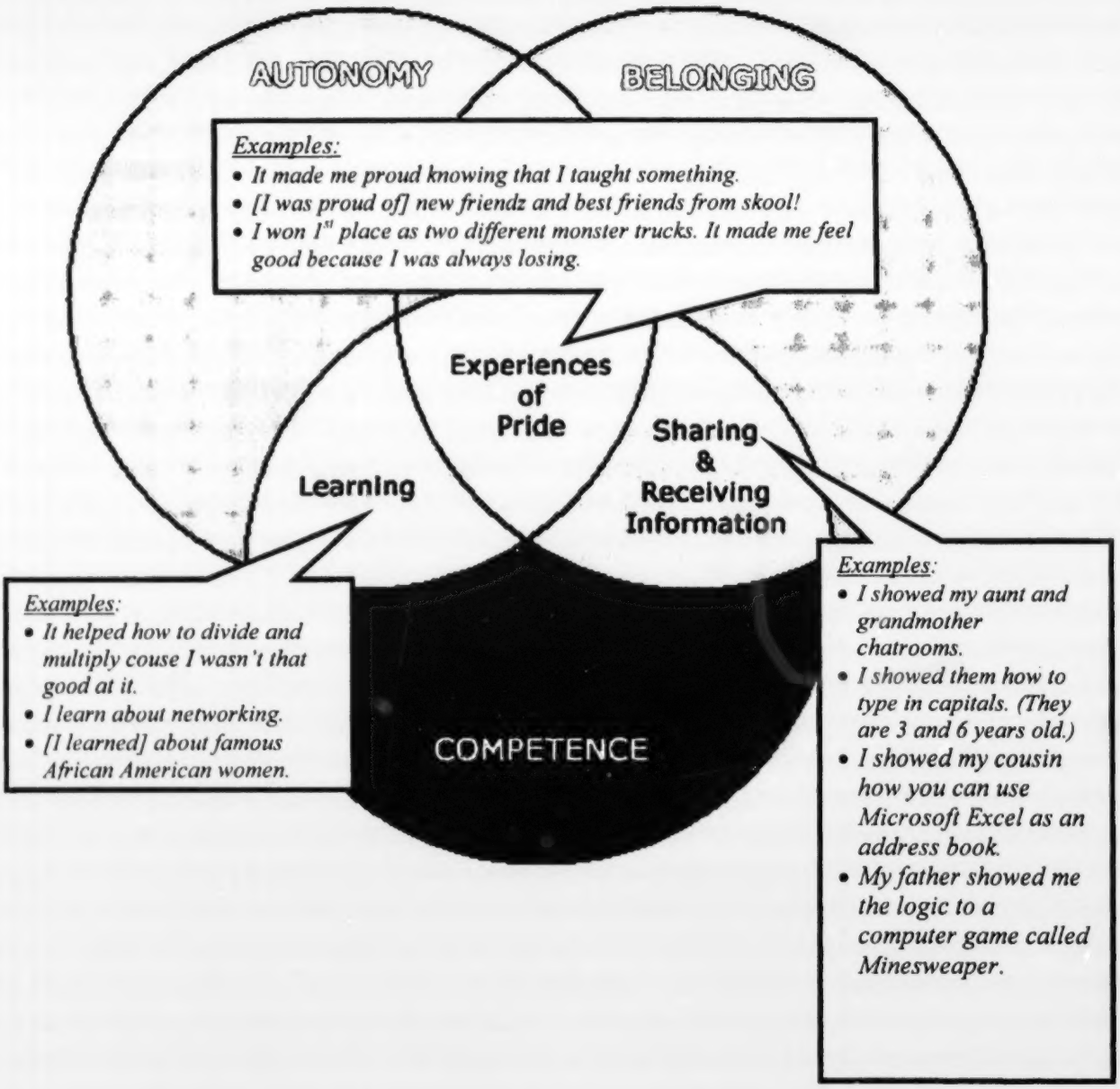
Type of sharing	Examples from students' journal responses
Basic hardware and software uses	How to hook up the monitor. How to install a game. How to set up a printer. I showed them how to type in capitals. (They are 3 and 6 years old.) How you can get on the Internet and search for what you need. I showed my brother how to look for different types of pictures. How to use a spreadsheet.
Computer-related activities participants find useful and enjoyable	I showed my aunt and grandmother chatrooms. I showed them the mtv.com singers like Nelly, JaRule, Mystical. How to save printer paper by saving on a document. How to play a game called 15 puzzle. How to get a smily face on instant messages. How to get a pen-pall and how to talk to ppl online.
Participants' own projects and products	Artwork I did. I explained to my mother that I made my own rythem or beat on a cool website. About what I can do on the computer.
More advanced uses of computing	I showed my cousin how you can use Microsoft excel as an address book.

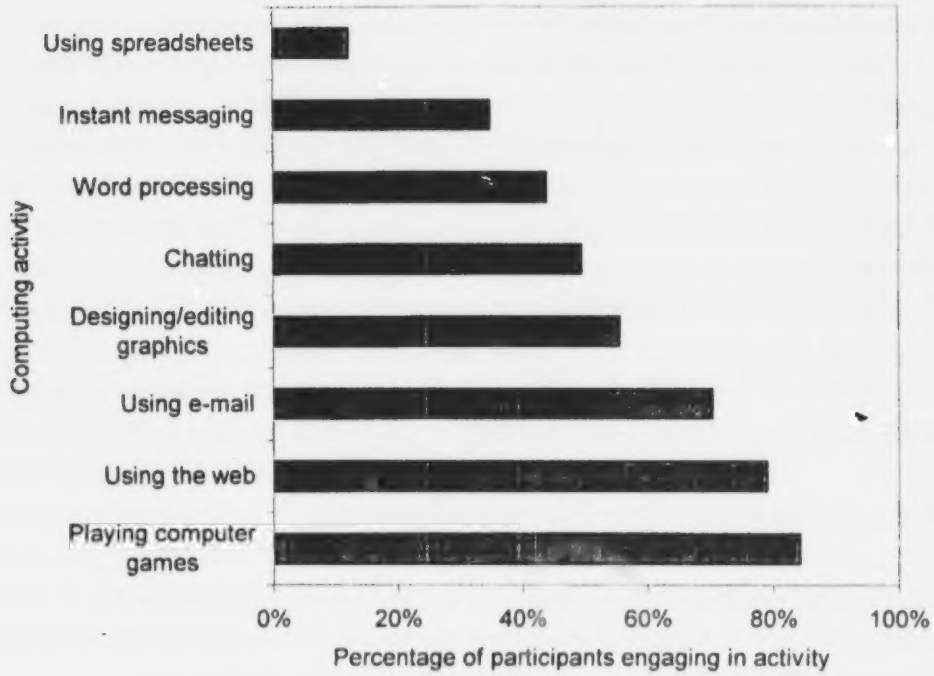
Figure Captions

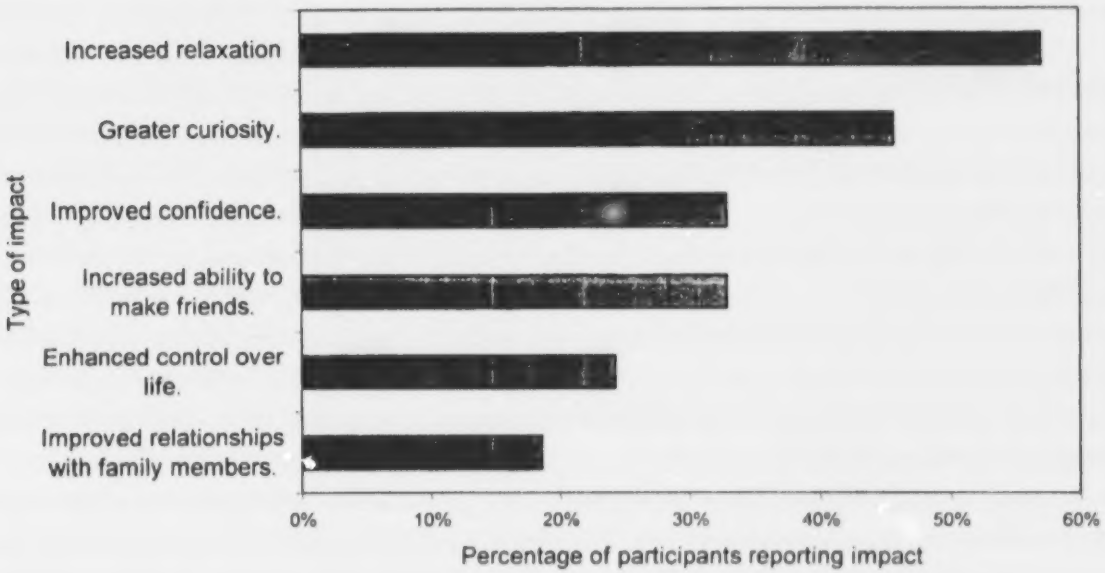
Figure 1. A conceptual map of the contribution of adolescents' subjective experiences of home computing to the fulfillment of their basic psychological needs.

Figure 2. Percentage of participants engaging in specific computing activities at least once during the three-day journal study.

Figure 3. Percentage of participants reporting positive long-term impacts of home computing in the post-survey.


AUTONOMY
BELONGING
Examples:
• It made me proud knowing that I taught something.
• [I was proud of] new friendz and best friends from skool!
• I won 1st place as two different monster trucks. It made me feel good because I was always losing.
Experiences of Pride
Learning
Sharing & Receiving Information
COMPETENCE
Examples:
• It helped how to divide and multiply couse I wasn't that good at it.
• I learn about networking.
• [I learned] about famous African American women.
Examples:
• I showed my aunt and grandmother chatrooms.
• I showed them how to type in capitals. (They are 3 and 6 years old.)
• I showed my cousin how you can use Microsoft Excel as an address book.
• My father showed me the logic to a computer game called Minesweaper.


Using spreadsheets
Instant messaging
Word processing
Chatting
Designing/editing graphics
Using e-mail
Using the web
Playing computer games
Computing activtiy
0%
20%
40%
60%
80%
100%
Percentage of participants engaging in activity


Increased relaxation
Greater curiosity.
Improved confidence.
Increased ability to make friends.
Enhanced control over life.
Improved relationships with family members.
Type of impact
0%
10%
20%
30%
40%
50%
60%
Percentage of participants reporting impact

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Signature: Kallen Tsikalas	Printed Name/Position/Title: Kallen Tsikalas	
Organization/Address: Computers for Youth: 505 8th Ave. Suite 2402 NY, NY 10018	Telephone	FAX 212.563.1215
	E-Mail Address: ktsikalas@cfyorg	Date 04/09/02

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